8. BYCATCH

The Magnuson-Stevens Act defines bycatch as fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic and regulatory discards. As a result, other species such as seabirds and marine mammals are considered "incidental catch." As bycatch tends to occur in fisheries that operate across jurisdictional boundaries, governing bodies, and legal statutes, bycatch reduction often becomes a complex issue. Bycatch reduction in HMS fisheries and bycatch reduction of HMS in other fisheries is no exception. Bycatch information relevant to each HMS gear type has already been discussed in previous sections of this document. This chapter describes the actions NOAA Fisheries has taken to reduce bycatch and incidental catch and any results of those actions.

8.1 Comprehensive Bycatch Reduction Strategy

The NOAA Fisheries HMS bycatch reduction program includes an evaluation of current data collection programs, implementation of bycatch reduction measures such as gear modifications and time/area closures, and continued support of data collection and research relating to bycatch. Details on bycatch and bycatch reduction measures can be found in Section 3.5 of the Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks (HMS FMP; NMFS, 1999), in Regulatory Amendment 1 to the HMS FMP (NMFS, 2000), and in Regulatory Adjustment 2 to the HMS FMP (NMFS, 2002).

Bycatch Reporting Methodology

NOAA Fisheries utilizes self-reported data (HMS logbook program and the new supplemental discard report form in the reef fish, snapper-grouper, king and Spanish mackerel, and shark logbook programs), at-sea observer data, and survey data (recreational fishery dockside and telephone surveys) to produce bycatch estimates. These data are collected with respect to fishing gear type and have been presented by gear type in this report in prior sections. The number and location of discarded fish are recorded, as is the disposition of the fish, i.e., released alive vs. released dead. Post-release mortality of HMS is accounted for in stock assessments to the extent that the data allow.

Effective August 1, 2001, selected Federal permit holders in the Gulf of Mexico reef fish, South Atlantic snapper-grouper, king and Spanish mackerel, and shark fisheries must report all species and quantities of discarded (alive and dead) sea turtles, marine mammals, birds, and finfish on a supplemental discard form. A randomly selected sample of 20 percent of the vessels with active permits in the above fisheries is selected each year. The selection process is stratified across geography (Gulf of Mexico and South Atlantic), gear (handline, longline, troll, gillnet, and trap), and number of fishing trips (ten or less trips and more than 11 trips). Of the 2,676 vessels with Federal permits in these fisheries in 2001, a total of 454 vessels were selected to report in 2001. Of the 2,319 vessels with Federal permits in the fisheries in 2002, 450 were selected to

report in 2002.

In addition to existing programs in some commercial HMS fisheries, NOAA Fisheries has the authority to use observers to collect bycatch information from commercial vessels fishing for tunas and voluntarily, from vessels with HMS charter/headboat or angling permits. Many of these vessels already complete Federal and/or state logbooks (e.g., the NOAA Fisheries Northeast Region Vessel Trip Report (VTR) Program), in which they are required to report all fishing information, including that for HMS. NOAA Fisheries is currently evaluating various alternatives to increase logbook coverage of vessels fishing for HMS, such as selecting additional HMS vessels to report in logbooks or be selected for observer coverage, and is investigating alternatives for electronic reporting.

NOAA Fisheries submits annual data (Task I) to ICCAT on mortality estimates (dead discards). These data are used and included in the SAFE report to evaluate bycatch trends in HMS fisheries.

NOAA Fisheries collects recreational bycatch data from dockside surveys (the Large Pelagic Survey and the Marine Recreational Fishery Statistics Survey) for the rod and reel fishery and uses these data to estimate dead discards. However, bluefin and yellowfin tuna are currently the only species for which expanded estimates are currently made. Statistical problems associated with small sample size remain an obstacle to estimating bycatch in the rod and reel fishery. New survey methodologies are being developed, however, especially for the Charter/Headboat sector of the rod and reel fishery, which should help to address some of the problems in estimating bycatch for this fishery. In addition, selecting rod and reel vessels for logbook reporting (as discussed above) would provide bycatch information for this gear type.

Marine Mammals

NOAA Fisheries relies on both fishery-dependent and fishery-independent data to produce stock assessments for marine mammals in the Atlantic Ocean, Gulf of Mexico, and Caribbean sea. The draft stock assessment reports are typically published around January and final reports are typically published in the Fall. Final 2001 stock assessment reports and draft 2002 reports are available and can be obtained from Emily Hanson Menashes at (301) 713-2322 or on the web at: http://www.nmfs.noaa.gov/prot_res/PR2/Stock_Assessment_Program/sars.html#Overview.

The final 2001 MMPA List of Fisheries published on August 15, 2001 (66 FR 42780). On January 17, 2002 (67 FR 2410), NOAA Fisheries published a notice that the 2001 List of Fisheries remained in effect for 2002. The proposed rule for the 2003 List of Fisheries was published on January 13, 2003 (68 FR 1414). The Atlantic Ocean, Caribbean, and Gulf of Mexico large pelagics longline fishery is classified as Category I (frequent serious injuries and mortalities incidental to commercial fishing) and the southeastern Atlantic shark gillnet fishery is classified as Category II (occasional serious injuries and mortalities). The following fisheries are

classified as Category III (remote likelihood or no known serious injuries or mortalities): Atlantic tuna purse seine; Gulf of Maine and mid Atlantic tuna, swordfish, and shark hook-and-line/harpoon, southeastern mid Atlantic and Gulf of Mexico shark bottom longline, and mid Atlantic, southeastern Atlantic, and Gulf of Mexico pelagic pelagic hook-and-line/harpoon fisheries. For additional information on the fisheries categories and how fisheries are classified, see http://www.nmfs.noaa.gov/prot_res/PR2/Fisheries_Interactions/list_of_fisheries.html.

NOAA Fisheries continues to investigate serious injuries to marine mammals as they are released from fishing gear. In April 1999, NOAA Fisheries held a joint meeting of the three regional scientific review groups to further discuss the issue. NOAA Fisheries is continuing to develop marine mammal serious injury guidelines and until these are published, NOAA Fisheries will apply the criteria listed by the review groups to make determinations for specific fisheries.

Sea Turtles

NOAA Fisheries has taken several steps in the past few years to reduce sea turtle bycatch and bycatch mortality in domestic longline fisheries. On March 30, 2001, NOAA Fisheries implemented via interim final rule requirements for U.S. flagged vessel with pelagic longline gear on board to have line clippers and dipnets to remove gear on incidentally captured sea turtles (66 FR 17370). The requirements to carry and to use the line clippers and dipnets have been in place since October 13, 2000 (65 FR 60889). Specific handling and release guidelines designed to minimize injury to sea turtles were also implemented.

A new Biological Opinion (BiOp) was completed on June 14, 2001, that found that the actions of the pelagic longline fishery jeopardized the continued existence of the loggerhead and leatherback sea turtles. This document reported that the pelagic longline fishery interacted with an estimated 991 loggerhead and 1012 leatherback sea turtles in 1999. The estimated take levels for 2000 are 1256 loggerhead and 769 leatherback sea turtles (Yeung 2001).

On July 13, 2001 (66 FR 36711), NOAA Fisheries published an emergency rule that closed the NED to pelagic longline fishing (effective July 15, 2001), modified how pelagic longline gear may be deployed effective August 1, 2001, and required that all longline vessels (pelagic and bottom) post safe handling guidelines for sea turtles in the wheelhouse. On December 13, 2001 (66 FR 64378), NOAA Fisheries extended the emergency rule for 180 days through July 8, 2002. On July 9, 2002, NOAA Fisheries published a final rule (67 FR 45393) that closed the Northeast Distant (NED) Area to pelagic longline fishing. As part of the Reasonable and Prudent Alternative, the BiOp required NOAA Fisheries to conduct an experiment with commercial fishing vessels to test fishery-specific gear modifications to reduce sea turtle bycatch and mortality. This rule required the length of any gangions to be 10% longer than the length of any floatline on vessels where the length of both is less than 100 meters; prohibited stainless steel hooks; and required gillnet vessel operators and observers to report any whale sightings and required gillnets to be checked every 0.5 to 2 hours.

The experimental program required in the BiOp was initiated in the NED area in 2001 in cooperation with the U.S. pelagic longline fleet that historically fished on the Grand Banks fishing grounds. The goal of the experiment is to test and develop gear modifications that might prove useful in reducing the incidental catch and post-release mortality of sea turtles captured by pelagic longline gear while striving to minimize the loss of target catch. Ideally, any successful measures will be transferable to other longline fleets to reduce sea turtle bycatch basin wide. The experimental fishery is scheduled to have a three year duration and utilizes 100% observer coverage to assess the effectiveness of the measures. The gear modifications tested in 2001 included blue dyed squid and moving gangions away from floatlines. In 2002, the NED experimental fishery examined the effectiveness of mackerel bait, circle hooks, and reduced daylight soak time. NOAA Fisheries is currently analyzing the results from 2002 and determining what measures to test in 2003.

Internationally, the United States is pursuing sea turtle conservation through international, regional, and bilateral organizations such as ICCAT, the Asia Pacific Fisheries Commission, and FAO Committee on Fisheries (COFI). The United States intends to provide a summary report to FAO for distribution to its members on bycatch of sea turtles in U.S. longline fisheries and the research findings as well as recommendations to address the issue. At the 24th session of COFI, the United States distributed a concept paper for an international technical experts meeting to evaluate existing information on turtle bycatch, to facilitate and standardize collection of data, to exchange information on research, and to identify and consider solutions to reduce turtle bycatch. COFI agreed that an international technical meeting could be useful despite the lack of agreement on the specific scope of that meeting. The United States has developed a prospectus for a technical workshop to address sea turtle bycatch in longline fisheries as a first step. Other gear-specific international workshops may be considered in the future.

Seabirds

The National Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries was released in February 2001. The NPOA for Seabirds calls for detailed assessments of longline fisheries, and, if a problem is found to exist within a longline fishery, for measures to reduce seabird bycatch within 2 years. NOAA Fisheries, in collaboration with the appropriate Councils and in consultation with the U.S. Fish and Wildlife Service, will prepare an annual report on the status of seabird mortality for each longline fishery. The United States is committed to pursuing international cooperation, through the Department of State, NOAA Fisheries, and U.S. Fish and Wildlife Service, to advocate the development of National Plans of Action within relevant international fora. The HMS Division intends to meet with longline fishery participants and other members of the public in the future to discuss possibilities for complying with the intent of the plan of action. Because interactions appear to be relatively low in Atlantic HMS longline fisheries, the adoption of immediate measures is unlikely. For additional information on the NPOA for Seabirds as well as the assessment of Atlantic HMS longline fisheries, see Appendix B.

8.2 Bycatch of Highly Migratory Species in Other Fisheries

NOAA Fisheries is concerned about bycatch mortality of Atlantic HMS in any federal or state-managed fishery which captures them. NOAA Fisheries plans to address bycatch of these species in the appropriate FMPs. For example, capture of swordfish and tunas incidental to squid trawl operations is to be addressed in the Squid, Mackerel, and Butterfish FMP. Capture rates of tunas in coastal gillnet fisheries are being explored through issuance of exempted fishing permits and reporting requirements. NOAA Fisheries continues to solicit bycatch data on HMS from all state, interjurisdictional, and federal data collection divisions. NOAA Fisheries supports development of an interstate plan for coastal sharks by the Atlantic States Marine Fisheries Commission which would support protection of sharks caught incidentally by state-managed fisheries.

Squid Mid-Water Trawl

U.S. squid trawl fishermen, using mid-water gear, landed 5.8 mt ww of yellowfin tuna, skipjack tuna, albacore tuna, bigeye tuna, and swordfish in 2001 (Table 8.1) incidental to the squid, mackerel, and butterfish trawl fishery (NMFS, 2001). Landings decreased from 2000 for bigeye tuna, albacore tuna and swordfish and increased slightly for yellowfin and skipjack tunas. Landings of bigeye tuna and swordfish had increased each year since 1998 before decreasing in 2001. Landed fish are counted through the dealer report program and by using information collected from tally sheets. In addition, squid trawl fishermen are required to report landings in the Large Pelagic Logbook or in the Multi-species Logbook. Bycatch of HMS in this fishery is not well-documented and observer funding for this fishery to document bycatch rates of HMS was provided in 2001 and 2002. A retention limit of five swordfish per trip allows squid trawl fishermen with swordfish limited access permits to land some of the swordfish that are encountered, although regulatory discards still occur. NOAA Fisheries continues to work with squid fishermen through the existing observer program to reduce bycatch.

Table 8.1 **Atlantic HMS Landed (mt ww) Incidental to Squid Trawl Fishing Operations in 1998-2001.** Data based on tally sheets submitted to NOAA Fisheries (NMFS, 2001).

Species	1998	1999	2000	
Yellowfin tuna	0.7	4.1	1.76	2.7
Skipjack Tuna	0.2	1.0	0.04	0.2
Bigeye Tuna	0.5	1.2	1.7	0.4
Albacore	2.4	0.4	0.03	0.0
Swordfish	5.9	7.5	10.9	2.5

Total	**9.7**	**14.2**	**14.43**	**5.8**

Menhaden Purse Seine

In the menhaden purse seine fishery, sharks were caught incidentally in approximately 30 percent of the purse seine sets (deSilva et al., 2001). Ten species of sharks were identified with blacktip sharks being the most common species. Approximately 20 percent of sharks were not identified to species. An estimated 30,000 sharks were taken in this fishery annually in 1994 and 1995. At the time of release, 75 percent of sharks were dead, 12 percent were disoriented, and 8 percent were healthy. The odds of observing shark bycatch was highest in April and May. Stomach analyses of sharks suggest that their occurrence in the fishery is probably the result of sharks preying on gulf menhaden (deSilva et al., 2001).

Industry workers in this fishery employ a fish excluder device to reduce the retention of sharks and other large species (Rester and Condrey, 1999). In addition, a recently introduced hose cage modification may prove to be effective in reducing shark bycatch. These devices vary in effectiveness and no standards exist for such bycatch reduction measures in this fishery. In addition, there are currently no reporting requirements for takes of sharks in the menhaden purse seine fishery. Recent estimates of large coastal sharks discarded in this fishery range from 20-25,000 individuals (Cortes et al., 2002)

Shrimp Trawl Fishery

Shark bycatch in the shrimp trawl fishery consists mainly of sharks too small to be highly valued in the commercial market. As a result, few sharks are retained. Bycatch estimates of LCS in this fishery have been generated and were reviewed in the most recent LCS assessment (Cortes et al. 2002). Cortes (2002) estimated bycatch in the south Atlantic shrimp trawl fishery (North Carolina, South Carolina, Georgia, and Florida) for Atlantic sharpnose, bonnethead, and finetooth sharks based on expansion by fishing effort. From 1992 to 1997, annual estimates of bycatch ranged from zero to almost six million sharks (Table 8.2) (Cortes, 2002). The 2002 SCS assessment, included estimates of SCS bycatch because they are likely to exceed in importance the landings for those species (Cortes, 2002). In general, however, requirements for turtle excluder devices in this fishery have probably resulted in less bycatch because sharks are physically excluded from entering the gear.

Table 8.2. Expanded estimates of bycatch (number of fish) of bonnethead, Atlantic sharpnose, and finetooth sharks in the U.S. south Atlantic shrimp trawl fishery based on within-stratum expansion by effort as trips by fishing year. Source: Cortes, 2002.

Year	Number of trips	Bonnethead	Atlantic sharpnose	
1992-1993	20,181	53,674	1,753,829	0

1993-1994	20,445	0	5,873,333	447,495
1995-1996	23,333	34,378	0	0
1996-1997	19,320	38,517	358,457	0

Bycatch of the SCS complex in the Gulf of Mexico shrimp trawl fishery consists mainly of Atlantic sharpnose and bonnethead sharks (Cortes, 2002). Estimates of the bycatch of SCS ranged from 3.2 to 1.3 million sharks per year from 1972-2000 (Table 8.3).

Table 8.3. Estimates (in thousands of individuals and pounds dressed weight) of the bycatch of small coastal sharks (as a complex and by species) in the shrimp trawl fishery operating in the Gulf of Mexico (Scott Nichols, NMFS Pascagoula Lab., pers. comm. as cited in Cortes, 2002).

Year	All SCS (numbers)	All SCS (lb dw)	Atlantic sharpnose (numbers)	Atlantic sharpnose (lb dw)	Bonnethead (numbers)	
1972	1,575	1,500	1,051	1,010	468	371
1973	1,579	1,580	831	842	620	525
1974	1,903	1,899	1,508	1,407	420	400
1975	2,055	1,997	1,587	1,473	347	313
1976	2,193	2,209	1,706	1,632	456	436
1977	2,187	2,142	1,507	1,457	520	427
1978	2,223	2,156	1,799	1,625	367	370
1979	2,829	2,754	2,384	2,254	388	341
1980	2,591	2,436	2,148	1,933	368	330
1981	2,081	2,007	1,830	1,649	242	252
1982	2,281	2,203	1,850	1,661	302	310
1983	2,138	2,193	1,856	1,821	255	250
1984	1,551	1,509	1,277	1,191	232	230
1985	1,767	1,796	1,451	1,442	260	249
1986	2,222	2,234	1,464	1,519	624	506
1987	3,216	3,123	2,636	2,392	516	519
1988	2,535	2,272	1,959	1,664	421	404
1989	2,116	2,216	1,632	1,713	336	286
1990	1,981	2,069	1,503	1,507	489	431
1991	2,350	2,322	1,784	1,756	365	323
1992	2,759	2,879	1,968	1,997	494	459
1993	2,226	2,213	1,710	1,626	416	400
1994	2,197	2,243	1,586	1,591	395	347
1995	2,401	2,362	1,806	1,636	311	299
1996	2,923	2,457	2,069	1,644	519	428
1997	2,883	2,926	1,732	1,681	486	439

1998	2,657	2,410	1,662	1,494	376	329
1999	1,282	1,257	906	848	218	198
2000	1,282	1,257	906	848	218	198

Summary

Although bycatch of swordfish and tunas in the squid trawl fishery is substantial, Atlantic shark bycatch in non-HMS fisheries remains a greater concern. Approximately nine percent (approximately 25,100) of the LCS coastal sharks were bycatch in the menhaden fishery alone and bycatch of SCS in the shrimp trawl fishery alone is expected to exceed landings. NOAA Fisheries will consider options for minimizing bycatch of LCS and SCS in other fisheries in the amendment to the HMS FMP. The management measure that counts dead discards against the Atlantic shark quota went into effect for the first time on January 1, 2003.

8.3 Preliminary Analysis of the Effectiveness of the Time/Area Closures

8.3.1 Objectives

During the past several years, NOAA Fisheries has implemented several time/area closures in the Atlantic Ocean and the Gulf of Mexico to reduce discards and bycatch. During the formulation of the rules implementing these measures, NOAA Fisheries utilized logbook data to estimate the effect of the closures on discarded species and target catch. Based on the nature of the data and the nature of the fishery, it is very difficult to assess with any certainty what the impacts will be prior to the closure. For example, as a result of a time/area closure, fishermen may shift their effort to a different area, they may change gear, or they may leave the fishery. These decisions could change the estimates. Thus, the most effective way to assess the impact is to examine the data available in the time after the closure has been implemented.

The 2001 fishing year provided the first year of data following the implementation of most of the HMS area closures. This subsection evaluates the effectiveness of the closures in reducing discards and bycatch and in maintaining target catch. Because the following analyses are based only on one year's worth of data, any results should be considered preliminary. Additional years of data are needed before any accurate conclusions can be drawn.

8.3.2 Methods

Data used in these analyses were taken from the HMS Logbook database administered through the NOAA Fisheries Southeast Region. These analyses are based on self-reported data and have not been compared to observer data. Catch data for each species and the number of hooks were summarized on a monthly basis for each area by year. The monthly and annual Atlantic wide totals were calculated for each species as well. A reference period of 1999-2000 was chosen for the initial comparisons to examine the effect of closures implemented in 2001. The percent change in 2001 from 1999-2000 in numbers kept and discards was calculated for the

entire Atlantic and by each area separately (Table 8.4). These percentages should be considered as preliminary results given that some of the closures were implemented prior to 2001 (e.g. June closure in the Mid-Atlantic Bight was implemented in 1999). Further analyses will be conducted as more data become available. Future analyses will also include: 1) a comparison of 1999-2001 data to pre-1999 data; 2) a comparison of the location of fishing effort before and after the closures; and 3) an economic analysis to estimate the impact on individual fishermen, to evaluate changes in fishing behavior as a result of implementation of the closures.

8.3.3 Results

Total Atlantic Ocean

The cumulative effects of the individual area closures were examined by comparing the 2001 catch and discards to the average for 1999-2000 throughout the entire Atlantic fishery. Changes in the numbers of fish caught and discarded were compared to the predicted values from Amendment 1 to the HMS FMP (NMFS, 2000). Results are shown in Tables 8.4 and 8.5. Overall effort, expressed as the number of hooks set, declined by almost 5% in 2001. Declines of 9.3% to 48.1% were noted for both kept and discards of swordfish, bluefin tuna, yellowfin tuna, large coastal sharks, and wahoo. Discards of bigeye tuna, pelagic sharks, blue and white marlin, sailfish, turtles caught and dolphin kept decreased by 11.4 to 71.5%. The only increases were observed in bigeye tuna kept (<1%), other BAYS tunas kept and discarded (20.7 and 97.3% respectively), pelagic sharks kept (16.1%), spearfish discards (19.7%) and dolphin discards (6.2%).

The declines in swordfish kept and discarded, large coastal sharks kept and discarded, and dolphin kept were similar to the predicted values developed for Amendment 1. Discards of bluefin tuna, pelagic sharks, all billfish with the exception of spearfish, and turtles caught declined more than the predicted values. Other BAYS tunas kept and pelagic sharks kept increased more than the predicted values. Despite the almost 20% increase in spearfish discards, the actual numbers of spearfish discarded are relatively low. The percent increase represents an increase of 23 fish in 2001.

Table 8.4. **Summary of the effectiveness of the various time/area closures implemented since 1999 for swordfish (SWO), bluefin tuna (BFT, Yellowfin tuna (YFT), bigeye tuna (BET), other BAYS, pelagic sharks (PEL) and large coastal sharks (LCS) (numbers represent the percent change in 2001 from average of 1999-2000; K = Kept, D = Discards).** Source: Pelagic Longline Logbook data.

			SWO		BFT		YFT		BET		Other BAYS		PEL		LCS	
Area		**Hooks**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**
Total Atlantic	Percent change from 1999-2000	**-4.7**	**-26.9**	**-25.6**	**-28.9**	**-48.1**	**-32.9**	**-22.7**	**0.8**	**-11.4**	**20.7**	**97.3**	**16.1**	**-16.5**	**-9.3**	**-22.1**
	Predict w/out effort redist.[1]		-24.6	-41.5		-1.0					-5.2		-9.5	-2.0	-32.1	-42.5
	Predict with effort redist.[1]		-13.0	-31.4		10.7					10.0		4.1	8.4	-18.5	-33.3
De Soto Canyon	Percent change from 1999-2000	**-90.4**	**-89.2**	**-94.3**	**-100**	**-100**	**-82.4**	**-98.4**	**-100**	**-100**	**-100**	**-100**	**-98.7**	**-94.3**	**-99.4**	**-91.0**
Percent of Total Atlantic	1999-00	2.8	1.9	3.8	1.8	3.6	4.0	5.5	0.1	0.1	0.1	8.3	2.5	0.1	2.2	3.0
	2001	0.3	0.3	0.3	0.0	0.0	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
	(+/-)	-2.5	-1.6	-3.5	-1.8	-3.6	-3.0	-5.4	-0.1	-0.1	-0.1	-8.3	-2.5	-0.1	-2.2	-2.6
Charleston Bump	Percent change from 1999-2000	**-24.2**	**-33.7**	**-42.1**	**-100**	**-100**	**-15.1**	**-58.8**	**209.5**	**-33.3**	**-53.8**	**-91.3**	**-42.9**	**-24.5**	**-59.3**	**-22.7**
Percent of Total Atlantic	1999-00	8.6	17.9	18.6	2.0	0.7	4.4	9.1	0.1	0.5	0.3	1.6	5.6	2.7	22.4	38.2
	2001	6.9	16.3	14.5	0.0	0.0	5.6	4.8	0.4	0.4	0.1	0.1	2.8	2.5	0.1	37.9
	(+/-)	-1.7	-1.7	-4.1	-2.0	-0.7	1.2	-4.2	0.3	-0.1	-0.2	-1.5	-2.8	-0.2	-12.4	-0.3
Florida East Coast	Percent change from 1999-2000	**-86.7**	**-90.9**	**-93.7**	**-100**	**-100**	**-80.0**	**-100**	**-44.0**	**-9.5**	**-50.0**	**-100**	**-81.8**	**-92.2**	**-67.3**	**-96.8**
Percent of Total Atlantic	1999-00	4.6	10.2	13.2	1.2	1.8	1.1	1.6	1.8	3.4	0.1	0.0	2.2	0.9	7.2	19.6
	2001	0.6	1.3	1.1	0.0	0.0	0.3	0.0	1.0	3.4	0.0	0.0	0.3	0.1	2.6	0.8
	(+/-)	-4.0	-8.9	-12.1	-1.2	-1.8	-0.8	-1.6	-0.8	0.0	-0.1	0.0	-1.9	-0.8	-4.6	-18.8

Table 8.4 (cont.). **Summary of the effectiveness of the various time/area closures implemented since 1999 for swordfish (SWO), bluefin tuna (BFT, Yellowfin tuna (YFT), bigeye tuna (BET), other BAYS, pelagic sharks (PEL), and large coastal sharks (LCS) (numbers represent the percent change in 2001 from average of 1999-2000; K = Kept, D = Discards).** Source: Pelagic Longline Logbook data.

			SWO		BFT		YFT		BET		Other BAYS		PEL		LCS	
Area		**Hooks**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**	**K**	**D**
Northeast Distant	Percent change from 1999-2000	**-27.9**	**-48.2**	**-31.1**	**-33.3**	**-37.5**	**-84.6**	**0.0**	**35.2**	**-37.7**	**202.2**	**50.0**	**-9.7**	**-18.0**	**0.0**	**-100**
Percent of Total Atlantic	1999-00	5.6	20.8	10.5	6.6	4.8	0.0	0.0	7.2	11.0	1.6	2.8	6.1	36.9	0.0	0.0
	2001	4.2	14.7	9.7	6.2	5.7	0.0	0.1	9.6	7.8	4.1	2.1	4.7	36.2	0.0	0.0
	(+/-)	-1.4	-6.1	-0.8	-0.4	0.9	0.0	0.0	2.4	-3.2	2.5	-0.7	-1.4	-0.7	0.0	0.0
Mid-Atlantic Bight	Percent change from 1999-2000	**-9.9**	**-5.1**	**-7.1**	**-60.0**	**-81.5**	**-50.6**	**-88.7**	**-33.1**	**-46.6**	**11.1**	**330.4**	**79.4**	**-47.9**	**104.6**	**42.5**
Percent of Total Atlantic	1999-00	9.5	4.6	6.0	7.0	19.3	5.9	6.1	28.2	32.6	47.5	12.9	11.9	19.0	14.5	1.8
	2001	9.0	5.9	7.5	4.0	6.9	4.4	0.9	18.8	19.7	43.7	35.2	18.4	11.8	32.7	3.2
	(+/-)	-0.5	1.4	1.5	-3.1	-12.4	-1.6	-5.2	-9.5	-13.0	-3.8	22.3	6.5	-7.1	18.2	1.4

[1] Predicted values from Table 7.19, Regulatory Amendment 1 to the Atlantic Tunas, Swordfish, and Sharks Fishery Management Plan (NMFS, 2000).

Table 8.5. **Summary of the effectiveness of the various time/area closures implemented since 1999 for blue marlin (BUM), white marlin (WHM), sailfish (SAIL), spearfish (SPEAR), dolphin, wahoo and turtles (numbers represent the percent change in 2001 from average of 1999-2000; K = Kept, D = Discards).** Source: Pelagic Longline Logbook data.

			BUM	WHM	SAIL	SPEAR	DOLPHIN		WAHOO		Turtles
Area		**Hooks**	**D**	**D**	**D**	**D**	**K**	**D**	**K**	**D**	**Caught**
Atlantic	Percent change from 1999-2000	**-4.7**	**-52.9**	**-47.5**	**-71.5**	**19.7**	**-9.1**	**6.2**	**-34.2**	**-28.7**	**-6.0**
	Predict. w/o effort redistribution [1]		-12.0	-6.4	-29.6		-29.3				-1.9
	Predict. w/ effort redistribution [1]		6.5	10.8	-14.0		-17.8				7.1
DeSoto	Percent change from 1999-2000	**-90.4**	**-90**	**-100**	**-100**	**-100**	**-74.3**	**0.0**	**-86.6**	**0.0**	**0.0**
Percent of Total Atlantic	1999-00	2.8	0.7	1.2	3.2	0.4	1.0	0.0	3.8	0.0	0.0
	2001	0.3	0.2	0.0	0.0	0.0	0.3	0.0	0.8	0.0	0.0
	(+/-)	-2.5	-0.6	-1.2	-3.2	-0.4	-0.7	0.0	-3.0	0.0	0.0
Charleston Bump	Percent change from 1999-2000	**-24.2**	**-53.1**	**-41.6**	**-58.6**	**45.5**	**-25.1**	**-34.8**	**32.9**	**-20.0**	**57.9**
Percent of Total Atlantic	1999-00	8.6	9.0	7.0	10.4	9.6	46.8	43.1	4.7	5.7	2.1
	2001	6.9	9.0	7.8	15.2	11.7	38.5	26.5	4.8	6.5	3.5
	(+/-)	-1.7	0.0	0.8	4.7	2.1	-8.3	-16.7	0.1	0.7	1.4
Florida East Coast	Percent change from 1999-2000	**-86.7**	**-96.3**	**-100**	**-99.0**	**-100**	**-92.0**	**-100**	**-92.0**	**-100**	**-100**
Percent of Total Atlantic	1999-00	4.6	8.0	3.6	16.5	4.4	6.6	5.6	1.9	2.3	0.6
	2001	0.6	0.6	0.0	0.6	0.0	0.6	0.0	0.2	0.0	0.0
	(+/-)	-4.0	-7.4	-3.6	-15.9	-4.4	-6.0	-5.6	-1.7	-2.3	-0.6
Northeast Distant	Percent change from 1999-2000	**-27.9**	**100**	**-100**	**0.0**	**-100**	**-91.3**	**0.0**	**-100**	**0.0**	**-16.3**
Percent of Total Atlantic	1999-00	5.6	0.1	0.6	0.0	0.9	0.5	0.0	0.0	0.0	63.3
	2001	4.2	0.5	0.0	0.0	0.0	0.0	3.7	0.0	0.0	56.4
	(+/-)	-1.4	0.4	-0.6	0.0	-0.9	-0.5	3.7	0.0	0.0	-6.9
Mid-Atlantic Bight	Percent change from 1999-2000	**-9.9**	**-25.5**	**-51.2**	**-100**	**100**	**-7.3**	**-59.1**	**26.5**	**100**	**-50.0**
Percent of Total Atlantic	1999-00	9.5	1.9	14.0	0.0	0.4	6.0	7.2	0.5	0.6	7.1
	2001	9.0	3.0	13.0	0.0	0.7	6.1	2.8	1.0	1.6	3.8
	(+/-)	-0.5	1.1	-1.0	0.0	0.3	0.1	-4.4	0.5	1.0	-3.3

[1] Predicted values from Table 7.19, Regulatory Amendment 1 to the Atlantic Tunas, Swordfish, and Sharks Fishery Management Plan (NMFS, 2000).

De Soto Canyon

The De Soto Canyon closure went into effect on November 1, 2000, as a result of the implementation of Regulatory Amendment 1 to the HMS FMP (NMFS, 2000.). Based on the data presented in Tables 8.4 and 8.5, compliance with this closure was almost 100%. The number of hooks set in the two closure areas in 2001 decreased 90% from the 1999-2000 average. Almost all species categories decreased by 100% to zero kept or discarded. Exceptions to this were swordfish kept and discarded, yellowfin tuna kept and discarded, both pelagic and large coastal sharks kept and discarded, and dolphin/wahoo kept. However all of these decreased by approximately 90% from the 1999-2000 average, except for the number of dolphin kept (-74%). Prior to the closure, catches in this area ranged from 0.1 to 8.3% of the total Atlantic and decreased to 0 to 1.1% of the total after implementation.

Charleston Bump

The Charleston Bump Closure Area was implemented by Regulatory Amendment 1 to the HMS FMP, effective March 1, 2001 (66 FR 8903, February 5, 2001 and NMFS, 2000). This area is closed from February to April of each year. In comparing the percent change from 1999-2000 to 2001 (Tables 8.4 and 8.5), most of the species categories showed a decline, but to a lesser extent than the Florida East Coast and De Soto Canyon areas because it is not a year round closure. Seven of the nine species kept showed considerable decreases (25 to 100%), while twelve of the thirteen species discarded also showed considerable decreases (20 to 100%). The number of hooks set decreased by 24.2%. Other notable decreases were: swordfish kept (-33.7%) and discarded (-42.1%), bluefin tuna kept and discarded (both -100%), yellowfin tuna kept (-15.1%) and discarded (-58.8%), bigeye tuna discards (-33.3%), other BAYS kept (-53.8%) and discarded (-91.3%), pelagic sharks kept (-42.9%) and discarded (-24.5%), and large coastal sharks kept (-59.3%) discarded (-22.7%). Bigeye tuna increased by 209%. However, the numbers reveal that the average number of bigeye tuna kept from 1999 to 2000 was only 21 and the number kept in 2001 was 65.

Table 8.5 reveals declines in discards of blue marlin (-53.1%), white marlin (-41.6%), and sailfish (-58.6%). It also shows moderate declines in dolphin kept (-25.1%) and discarded (-34.8%), and wahoo discards (-20.0%). By contrast, spearfish discards and wahoo kept increased by 45.5% and 32.9%, respectively. The actual number of spearfish discarded increased from an average of 11 in 1999-2000, to 16 in 2001. Turtles caught also increased (57.9%) but there was only a small increase in the actual numbers caught, from 9.5 on average to 15 in 2001. The percent of the total Atlantic catch from this area prior to the closure ranged from 0.1 to 46.8%. Following implementation of the closure, these percentages decreased to 0 to 38.5% of the total Atlantic catch.

Florida East Coast

The Florida East Coast Closure was implemented by Regulatory Amendment 1 to the HMS FMP, effective March 1, 2001 (66 FR 8903, February 5, 2001 and NMFS, 2000). In comparing the percent change from 1999-2000 to 2001 (Tables 8.4 and 8.5), most of the species categories showed a considerable decline which was expected since this was intended to be a year round closure. The number of hooks set decreased by almost 87%. Five of the nine species kept showed considerable decreases, while ten of the thirteen species discarded also decreased. This area showed a 100% decrease in the reported number of turtles caught. Most notable were the decreases in swordfish kept (-90.9%) and discarded (-93.7%), bluefin tuna kept and discarded (both -100%), yellowfin tuna kept (-80%) and discarded (-100%), pelagic sharks kept (-81.8%) and discarded (-92.2%), and large coastal sharks discarded (-96.8%).

There were marked declines in blue marlin (-96.3%), white marlin (-100%), sailfish (-99%), and spearfish (-100%) discards (Table 8.5). There were also considerable declines in wahoo kept and discarded (-92% and -100%, respectively), as well as a decline in turtles caught (-100%). The number of bigeye tuna kept and discarded decreased somewhat (-44.0% and -9.5%, respectively). Dolphin kept and discarded decreased to almost zero (-92% and -100%, respectively). The percent of the total Atlantic catch from this area prior to the closure ranged from 0 to 19.6%. Following implementation of the closure, these percentages decreased to 0 to 3.4% of the total Atlantic catch.

Northeast Distant Area

The Northeast Distant Statistical Reporting (NED) Area was closed by an emergency rule on July 15, 2001 (July 13, 2001, 66 FR 36711), to reduce interactions with sea turtles in the pelagic longline fishery. The closure was implemented on a more permanent basis by a final rule published on July 9, 2002 (67 FR 45393). In an effort to test experimental fishing measures designed to reduce the incidental capture of sea turtles in pelagic longline gear, NOAA Fisheries sponsored an experimental fishery in the NED area. The experimental fishery began in August 2001 and is designed to have a three year duration. In 2001, there were 10 vessels that participated, making 185.5 sets. Because of the presence of the experimental fishery, it is difficult to assess the effectiveness of the closed area in reducing sea turtle bycatch. Tables 8.4 and 8.5 show the level of effort and catch in the NED area prior to the closure in 1999 and 2000 and then during the first year of the closure in 2001.

In examining the past three years of data, it is possible to assess the impact of the NED experimental fishery, but not of the area closure. In comparing the data in Tables 8.4 and 8.5 for 2001 versus 1999-2000, most of the categories demonstrate a decline. Most notable are the decreases in number of hooks set (-27.9%), swordfish kept (-48.2%) and discarded (-31.1%), bluefin tuna kept (-33.3%) and discarded (-37.5%), yellowfin tuna kept (-84.6%), spearfish and

white marlin discarded (both -100%), large coastal sharks discarded (-100%), dolphin kept (-91.3%), and wahoo kept -100%). Conversely, there were several increases noticeable during the 2001 NED experimental fishery. The amount of bigeye tuna kept (35.2%), other BAYS kept and discarded (202.2% and 50%, respectively), and blue marlin discards (100%) increased. However, the actual number of blue marlin caught and discarded in 2001 was only three fish. Because the vessels participating in the NED experimental fishery were not fishing in their usual manner, NOAA Fisheries can not attest to the relevance of these results in demonstrating the impact of the NED closure. The experimental fishing measures tested in 2001 (blue dyed bait, moving gangions away from floatlines, and increasing the length of gangions in sets where the floatline plus gangions depth was not more than 100 meters) may have contributed to the results seen in the logbook data. As these measures where not effective in reducing the catch of sea turtles, NOAA Fisheries examined new fishing methods in 2002. The results of this research will be available by mid-2003.

Mid-Atlantic Bight

The June Mid-Atlantic Bight (MAB) closure area was implemented as part of the implementation of the HMS consolidated regulations (64 FR 29090, May 28, 1999) in order to decrease bluefin tuna bycatch in the pelagic longline fishery. Caution should be exercised in reviewing the results in Tables 8.4 and 8.5 for the effectiveness of this closure since it was already in effect in 1999 and 2000. The 2001 results in Tables 8.4 and 8.5 for the MAB should be on par with the 1999-2000 average. Further evaluation of this closure may be possible by examining pre-1999 data. Large decreases in the number of bluefin tuna kept (-60%) and discarded (-81.5%), yellowfin tuna kept (-50.6%) and discarded (-88.7%), bigeye tuna kept (-33.1%) and discarded (-46.6%) and pelagic sharks discarded (-47.9%) occurred in 2001 relative to the average for 1999-2000. The numbers of swordfish kept (-5.1%) and discarded (-7.1%) and dolphin kept (-7.3%) decreased slightly, while the numbers of other BAYS tunas discarded (330.4%), pelagic sharks kept (79.4%), and large coastal sharks kept (104.6%) increased. The apparent large increase in BAYS tunas discarded is due to an increase from an average of 115 fish from 1999-2000 to 495 in 2001. Although the number of spearfish discarded appeared to double, this represented an increase of only one fish caught in 2001 as opposed to the average of 0.5. White marlin discards decreased a little more than 50% in 2001. The percent of the total Atlantic catch from this area during 1999-2000 averaged from 0 to 47.5%. These percentages remained relatively stable, ranging from 0 to 43.7% of the total Atlantic catch.

The following tables (Tables 8.6 and 8.7) provide an enumeration of logbook submissions of the disposition of bluefin tuna catches (kept, discarded dead, discarded alive). These tables have been presented in previous SAFE reports. In Table 8.6, the rows designated as"closed" represent the area in the Northeast/Mid-Atlantic Bight (MAB) closed to pelagic longline fishing during the month of June. "Open" represents all other open areas in the Atlantic Ocean. Table 8.6 demonstrates that the June (MAB) closure was effective at reducing dead discards of bluefin tuna from that area. These data do not indicate that the closed area outside of June is problematic

because the higher estimates of dead discards in 1999 and 2000 seem to occur in the remaining open areas (i.e., expanding the closed area to include other months does not appear warranted at this time). Total numbers of both dead and live discards of bluefin tuna decreased in 2001. This decline may indicate that the other time/area closures may also have had an impact.

Table 8.6. Number of bluefin tuna (BFT) reported in the pelagic logbook program as kept, discarded dead, or discarded alive in and out of the MAB "closed area".

Month	Area	BFT kept					BFT discarded dead					BFT discarded alive				
		1997	1998	1999	2000	2001	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
Jan	Closed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Open	18	9	22	23	7	5	15	3	2	2	5	35	8	1	6
Feb	Closed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Open	10	10	27	27	13	1	11	7	30	0	12	14	9	18	1
Mar	Closed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Open	23	17	38	37	14	4	14	13	106	7	9	51	27	37	3
Apr	Closed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Open	4	14	44	43	47	2	6	50	90	41	6	17	39	21	24
May	Closed	1	1	1	0	0	2	1	2	0	0	4	1	20	0	0
	Open	21	23	28	42	21	18	21	42	21	25	26	33	96	18	20
June	Closed	14	10	0	0	0	144	156	0	0	0	159	278	2	0	1
	Open	29	25	28	15	14	56	182	87	18	40	42	194	122	23	68
July	Closed	3	13	7	0	2	3	32	1	8	0	15	53	0	8	8
	Open	35	30	11	12	10	32	20	5	31	2	57	35	12	7	15
Aug	Closed	0	0	2	1	0	0	0	0	3	0	0	0	0	0	0
	Open	23	6	9	3	2	1	2	1	0	0	5	2	0	0	9

Sept	Closed	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1
	Open	12	4	0	8	10	0	1	1	1	21	0	4	0	2	27
Oct	Closed	0	7	6	7	3	0	9	0	20	5	1	30	2	154	7
	Open	9	25	12	5	4	0	0	0	3	6	0	1	0	45	3
Nov	Closed	7	10	2	5	2	7	14	1	0	0	6	20	0	15	1
	Open	5	11	9	3	28	0	11	1	9	2	7	33	1	9	0
Dec	Closed	10	1	2	1	0	22	3	1	5	0	39	0	0	16	1
	Open	10	16	15	2	0	14	4	6	7	1	11	6	45	9	1
Total		234	232	263	235	177	311	502	222	354	152	404	807	383	383	196

Catch patterns of other target species and bycatch by pelagic longline gear are also presented by combining the number of fish landed and discarded by month as reported in the pelagic logbook. The portion of Table 8.7 designated as "Closed" represents the area in the Northeast/Mid-Atlantic bight that is closed in June but the number represents those fish caught in that area for the entire year; "Open" represents all other open areas of the Atlantic Ocean fished by U.S.-flagged pelagic longline vessels. "Discarded" is both discarded dead and discarded alive.

Table 8.7. Number of bluefin tuna, swordfish, sharks, billfish, and turtles kept and discarded inside and outside of the June, Northeast/Mid-Atlantic Bight as reported in the pelagic logbook data (numbers in parentheses represent percent change from 2000 to 2001).

Species	Closed area					Open area				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
BFT kept	35	42	20	14	7 (-50%)	199	190	223	215	177 (-18%)
BFT discarded	402	597	30	122	24 (-80%)	313	712	573	612	348 (-43%)
Swordfish kept	2,075	3,315	1,656	4,300	2,826 (-34%)	67,000	66,000	63,000	56,138	47,560 (-15%)
Swordfish discarded	1,089	1,469	990	1,269	1,049 (-17%)	19,810	21,175	19,308	15,490	13,993 (-10%)
Pelagic sharks kept	401	368	276	432	635 (+47%)	4,834	3,388	2,543	2,552	3,460 (+36%)
Pelagic sharks discarded	16,672	12,486	5,378	5,430	2,816 (-48%)	66,108	32,126	24,082	21,492	23,813 (+11%)
LCS kept	1,734	816	1,030	1,040	2,118 (+104%)	25,500	11,492	12,024	7,108	6,478 (-9%)
LCS discarded	82	58	90	129	156 (+21%)	8,300	6,047	6,193	6,679	4,836 (-28%)
Billfish discarded	333	96	411	93	130 (+40%)	7,385	3,670	4,400	3,670	1,976 (-46%)
Turtle interactions	12	23	49	15	16 (+7%)	255	898	593	169	424 (+151%)

Based on reported data, Table 8.7 demonstrates that bluefin tuna discards in the MAB closure area have been reduced considerably due to the June closure from 1999 to 2001. Annual landings and discards of bluefin tuna from both the MAB closure area and remaining open areas were reduced in 2001, possibly due to the additional time/area closures elsewhere (Tables 8.6 and 8.7). These data also indicate that discards of swordfish and pelagic sharks from the MAB closure area were reduced in 2001, although discards of pelagic sharks from open areas increased slightly (11%). The number of pelagic sharks kept increased in both the open areas and the MAB closure area. Landings of large coastal sharks from the MAB closed area doubled in 2001. Although the discards of billfish increased in the MAB closure area, discards of billfish from the remaining open areas decreased by almost 50%.

8.3.4 Prohibition of Live Bait in the Gulf of Mexico

Regulatory Amendment 1 to the HMS FMP prohibited the use of live bait on pelagic longline gear in the Gulf of Mexico due to concerns over the incidental bycatch of billfish. Based on reported data, the number of hooks set with live bait or a combination of live and dead bait in the Gulf of Mexico decreased from 22.7% in 2000, to 1.7% in 2001. Overall, the number of hooks set in the Gulf of Mexico remained relatively steady from 1999-2001, averaging 3.3 million hooks. Further analysis of the effectiveness of the live bait prohibition in the Gulf of Mexico pelagic longline fishery may continue in 2003.

Table 8.8. Comparison of the number of hooks set in the Gulf of Mexico with dead or live bait, or a combination of both baits, 1999-2001 (numbers in parantheses are percent of the total number of hooks in the Gulf of Mexico). Source: Pelagic Longline Logbook data.

	Year		
Bait Type	**1999**	**2000**	**2001**
Dead	2,335,845 (70.9)	2,598,083 (77.3)	3,176,493 (98.3)
Live	372,162 (11.3)	259,256 (7.7)	5,500 (0.2)
Both	584,473 (17.8)	505,582 (15.0)	49,250 (1.5)
Total	3,292,480	3,362,921	3,231,243

8.3.5 Conclusions

Based on one year of self-reported data, it appears as though the time/area closures and live bait prohibition in the Gulf of Mexico have been relatively successful at reducing bycatch in the HMS pelagic longline fishery. Billfish discards, except for spearfish, have all declined. The number of turtles caught, swordfish discarded, bluefin tuna discarded, and large coastal sharks have also declined. However, the number of target species kept such as swordfish and yellowfin tuna, also decreased. This is contrary to the other objective of these regulations of minimizing the reduction in target catch.

All of these results should be considered preliminary. Additional years of data are needed before the effect of these measures can be analyzed fully. As described in the methods section of this subsection, NOAA Fisheries plans to continue to analyze these measures as additional data becomes available.

8.4 Evaluation of Other Bycatch Reduction Measures

The following section provides a review of additional management measures or issues that may address bycatch reduction:

- Reduce length of longline to increase survival of marine mammals and turtles:

The effectiveness of this measure has not been analyzed. However, NOAA Fisheries intends to conduct an analysis of this measure in 2003.

- Atlantic Large Whale Take Reduction Plan (ALWTRP) regulations:
  Observers were placed on shark drift gillnet vessels during right whale calving season (November 15- March 31, 2002) off the East Coast of Florida between Fort Pierce and West Palm Beach and covered 24 strikenet and 41 drift gillnet sets (Carlson and Baremore, 2002). No large whales or other marine mammals were observed caught by this gear during right whale calving season in 2002. No marine mammals or sea turtles were observed caught on strikenet sets. Three sea turtles (loggerhead and leatherback) were caught and all were released alive.

- Atlantic Bottlenose Dolphin Take Reduction Team:
  Due to the observed takes of Atlantic bottlenose dolphin in the shark drift gillnet fishery, representatives of the fishery have been included in the Atlantic Bottlenose Dolphin Take Reduction Team. The Team completed initial deliberations in April of 2002 and another meeting to discuss issues specific to North Carolina and Virginia is planned for April of 2003. NOAA Fisheries is working on developing a draft take reduction plan for Atlantic coastal bottlenose dolphins and expects to publish a proposed rule after the April 2003 meeting.

- MMPA List of Fisheries Update/Stock Assessment:
  NOAA Fisheries continues to update the MMPA List of Fisheries and the 2002 final list is available. The proposed 2003 List of Fisheries was published on January 13, 2003. Final 2001 marine mammal stock assessment reports and draft 2002 reports are also available. See section 8.1 for information on obtaining these reports.

- Atlantic Offshore Cetacean Take Reduction Team (AOCTRT):
  NOAA Fisheries Office of Protected Resources has disbanded the AOCTRT due to the fact that two of the three fisheries addressed by the AOCTRT were closed by fishery management actions, leaving only the pelagic longline fishery, which has also been the subject of recent fishery management actions and increased observer coverage related to bycatch. NOAA Fisheries intends to review the fishery and any marine mammal interactions in the future to determine if additional take reduction measures are necessary at that time.

- Observer coverage of shark drift gillnet fleet:
  On March 30, 2001, NOAA Fisheries reduced the level of observer coverage required in the shark drift gillnet fishery from 100 percent year-round to 100 percent during right whale calving season and a statistically significant level during the rest of the year. Recent scientific analyses indicate that a 53 percent level of

coverage is statistically significant and adequate to provide reasonable estimates of sea turtle and marine mammal takes outside of the right whale calving season. The level of observer coverage necessary will be re-evaluated annually and adjusted accordingly. In 2002, 14 strikenet and 28 driftnet sets were observed during non-right whale calving season (Carlson and Baremore, 2002). One bottlenose dolphin was discarded dead in a driftnet set. No other interactions with sea turtles or marine mammals were observed. Management options to address issues in the shark drift gillnet fishery will be considered in the amendment to the HMS FMP.

- Vessel monitoring systems in the pelagic longline fishery
  NOAA Fisheries adopted fleet-wide VMS requirements in the Atlantic pelagic longline fishery in May 1999, but was subsequently sued by an industry group. By order dated September 25, 2000, the U.S. District Court for the District of Columbia prevented any immediate implementation of VMS in the Atlantic pelagic longline fishery, and instructed to "undertake further consideration of the scope of the [VMS] requirements in light of any attendant relevant conservation benefits."

  On October 15, 2002, the court issued a final order that denied plaintiffs objections to the VMS regulations. Based on this ruling NOAA Fisheries is seeking to reinstate OMB approval for the information collection (67 FR 69506) and plans to implement the requirement in early 2003.

8.5 Recommendations to Reduce Bycatch

In 1998, NOAA Fisheries published a National Bycatch Plan (NOAA, 1998). The plan recommended numerous actions to address bycatch mortality. Table 8.9 lists the recommendations and actions taken by NOAA Fisheries thus far to address these issues.

Table 8.9. Recommendations for Addressing Bycatch Mortality in HMS Fisheries and Actions Planned or Taken to Address These Recommendations.

Recommendation	1999-2001 Actions	2002 Actions	Expected Actions in 2003
Reduce bycatch and bycatch mortality of undersized swordfish and tunas.	Proposed closure of critical swordfish nursery areas. Closed critical swordfish nursery areas to pelagic longline fishing (Am. 1 to HMS FMP). Held educational workshop for recreational fishermen at Miami International Boat Show in Feb. 2001.	Rulemaking on Atlantic bluefin tuna incidental catch limits. Promoted use of circle hooks in swordfish recreational fisheries through an outreach program.	Analyses of time/area closures and other bycatch reduction methods.
Improve data on the character and magnitude of bycatch to allow quantitative estimates of discards in the fisheries for use in stock assessments and making management decisions.	Pursued submission of bycatch data by ICCAT countries for analyses to develop measures to reduce small swordfish bycatch stock-wide. Researched estimating discard rates and volumes based on direct observations by scientific fishery observers. Conducted independent review of methodology used to estimate bluefin tuna dead discards. Started collection of discard data in snapper-grouper/reef fish/shark logbook program. Conducted year one of Northeast Distant Area experiment.	Conducted year two of Northeast Distant Area experiment. Continued observer coverage in pelagic and bottom longline and shark drift gillnet fisheries. Changed bottom longline observer program from voluntary to mandatory.	Conduct year three of Northeast Distant Area experiment. Continue observer coverage in pelagic and bottom longline and shark drift gillnet fisheries.

Recommendation	1999-2001 Actions	2002 Actions	Expected Actions in 2003
Improve gear-handling techniques to reduce mortality.	Held educational workshops for recreational and commercial fishermen. Distributed handling protocols for marine mammals and sea turtles Held pelagic longline gear workshop in January. Required line clippers and dipnets on pelagic longline vessels. Required posting of turtle handling/release guidelines in wheelhouse of all longline vessels.	Conducted year two of Northeast Distant Area experiment, including: evaluation of de-hooking devices; drift gillnet checks; and gangions and floatline lengths.	Conduct year three of Northeast Distant Area experiment.

Recommendation	1999-2001 Actions	2002 Actions	Expected Actions in 2003
Conduct research on gear-deployment methods that will reduce interactions between and mortality of protected species that encounter fishing gear.	Transferred funding for gear development to NSIL. Funded a circle hook study in the Azores. Developed a dipnet and line cutter that would decrease injuries to turtles; these devices required as of Nov. 2000 on all pelagic longline vessels. Development of revised design of lightsticks that do not attract turtles, other gear modifications (NSIL, 2000). Held pelagic longline gear workshop in January. Conducted year one of Northeast Distant Area experiment.	Conducted year two of Northeast Distant Area experiment.	Conduct year three of Northeast Distant Area experiment.
Work cooperatively with the fishing industry to transfer new knowledge and techniques between fishermen and researchers.	Held educational workshops include research results on the agenda. Conducted cooperative research with pelagic longline industry members to explore lightstick color and design effects on turtle hooking rates. Held pelagic longline gear workshop in January. Conducted year one of Northeast Distant Area experiment.	Conducted year two of Northeast Distant Area experiment. Pursued other cooperative research funds and programs.	Conduct year three of Northeast Distant Area experiment.

Recommendation	1999-2001 Actions	2002 Actions	Expected Actions in 2003
Improve knowledge of (1) basic biology and stock status of shark species in the Northwest Atlantic and (2) the effects of bycatch mortality on shark populations.	Funded the following research: - Center for shark research at Mote Marine Lab: shark biology - Univ of MI: shark nursery grounds - Gulf and South Atlantic Fishery Development Foundation/University of Florida: observer program and biology - COASTSPAN. Participated in pelagic shark assessment in February, 2000. ICCAT Bycatch sub-committee recommended that SCRS conduct shark assessments in 2002; ICCAT Bycatch sub-committee data preparatory meeting on pelagic sharks; ICCAT recommended blue and shortfin mako assessments be conducted in 2004. Developed draft National Plan of Action for Sharks; Final Shark NPOA published commensurate with the FAO International Plan of Action for Sharks to assess direct and indirect shark fisheries, stock status, and promote more effective and sustainable shark management. SCS data preparatory meeting for assessment.	Participated in LCS stock evaluation workshop and conducted LCS assessment. Funded peer review of LCS assessment. Conducted SCS assessment. Continued shark research programs. Funded the following research: - Center for shark research at Mote Marine Lab: shark biology - Gulf and South Atlantic Fishery Development Foundation/University of Florida: observer program and biology - COASTSPAN.	Continue shark research programs. Continue shark observer programs. Fund the following research: - Center for shark research at Mote Marine Lab: shark biology - COASTSPAN.

Recommendation	1999-2001 Actions	2002 Actions	Expected Actions in 2003
Increase research on the role of apex predators in structuring marine ecosystems, and assess the effects of bycatch of these stocks.	Funded and continued COASTSPAN, a study to identify shark nursery areas. Resource partitioning study underway. Post-release mortality study on sharks.	Continued COASTSPAN program. Continued resource partitioning study. Included bycatch data in SCS and LCS assessments. Provided funding for blue and white marlin tagging studies.	Continue COASTSPAN program. Continue resource partitioning study.
Reduce mortality and bycatch mortality of billfish captured in the directed fisheries for Atlantic HMS.	Implemented time/area closures in the South Atlantic Bight and Gulf of Mexico; encouraged the voluntary use of circle hooks; live bait prohibition in Gulf of Mexico; funded circle hook research in longline fishery (Falterman and Graves, 2000); conducted recreational circle hook research by NOAA Fisheries scientists (Prince, Venizelos, and Ortiz, 2000). Post-release mortality study on marlin.		Promote voluntary use of circle hooks through the recreational monitoring rule.
Determine the status of sailfish populations.	Preliminary assessment of sailfish conducted by ICCAT SCRS.		

Recommendation	1999-2001 Actions	2002 Actions	Expected Actions in 2003
Conduct research on post-release mortality of recreationally-caught billfish, tunas, and sharks.	Funded research on: - MA Div. Marine Fisheries: Effects of Hook Design - Bluefin tuna tagging Sponsored Catch and Release Conference in Nov. 1999 to share data, identify further research needs. Continued NOAA Fisheries-funded tagging programs. Post-release mortality study on sharks and marlin.	Continued NOAA Fisheries-funded tagging programs. Continued post-release mortality study on sharks and marlin. Provided funding for blue and white marlin tagging studies.	Continue NOAA Fisheries-funded tagging programs. Continue post-release mortality study on sharks and marlin.
Improve data collection and monitoring of the recreational tuna, shark, and billfish fisheries.	Implemented new voluntary Charter/Headboat observer program and logbook program. Increased tournament registration and reporting. Increased enforcement of tournament reporting and registration requirements. Proposed rule for new monitoring system for recreational billfish and swordfish landings.	Rulemaking on monitoring of recreational billfish and swordfish landings.	Rulemaking on charter/headboat and recreational vessel permit requirements, sale of fish, daily catch and retention limits, and timeframe for permit category changes. Rulemaking on non-tournament landings of swordfish and billfish (tournaments already required to report).

* Because stock assessments are conducted internationally by SCRS, NOAA Fisheries does not produce domestic stock assessments for ICCAT species. However, NOAA Fisheries has developed overfishing criteria based on the most recent assessment (1993) and has determined that West Atlantic sailfish are overfished and overfishing continues to occur.

8.6 Summary

It is difficult to compare fishing gears due to the differences in areas and seasons fished. Table 8.9 summarizes the total percentage of mortality attributed to bycatch for Atlantic HMS.

Table 8.9. Percent of Stock-Wide Mortality Attributed to U.S. Bycatch for HMS Stocks in 1998-2000 by weight (unless stated otherwise; Reported discards/total landings + discards).[1] Sources: SCRS, 2001.

Species/Stock	1998	1999	2000
North Atlantic Swordfish	4%	4.5%	10.1%
South Atlantic Swordfish	less than 0.1%	less than 0.1%	less than 0.1%
West Atlantic Bluefin Tuna[1]	4.5%	5.9%	4.7%
Large Coastal Sharks[2]	10.5% (by number)[3]	15% (by number)[3]	13.7% (by number)[3]
Pelagic Sharks[2]	30.5% (by number)[4]	16.2% (by number)[4]	36.8% (by number)[5]
Small Coastal Sharks[2]	Unknown	Unknown	In preparation[6]
North Atlantic Blue Marlin	3.5%	6.3%	7.2%
North Atlantic White Marlin	8.9%	14.8%	12.6%
West Atlantic Sailfish	4.6%	13.5%	8.9%
Spearfish	0%	0%	0%

[1] Based on the landings and discards reported to ICCAT for stocks fished on by U.S. fishermen. It should be noted that discards of BAYS tunas to ICCAT are generally not reported.
[2] There is no international estimate of total landings or discards of sharks, the percentages therefore reflect the U.S. mortality due to bycatch.
[3] Cortes, 2000; E. Cortes, pers. comm. 2001
[4] Recreational landings estimates from Cortes 2000; commercial estimates from Cortes 2000 and Cramer 1999 and Cramer and Adams 2000. For the commercial landings estimates, the commercial landings (in lbs dw) from Cortes 2000 were divided by the average sizes for pelagic and blue sharks for 1998 and 1999 from Cramer 1999 and 2000, respectively, to generate commercial landings by number. The number of dead discards for pelagic blue sharks for 1998 and 1999 were from Cramer 1999 and Cramer and Adams 2000, respectively.
[5] Cortes, 2001
[6] Stock assessments for LCS and SCS will be conducted in 2002, which will include bycatch estimates.

In Table 3.47 of the HMS FMP, NOAA Fisheries identified the significance of bycatch of certain species in various HMS fisheries. Table 8.10 below indicates action NOAA Fisheries has taken to address those issues and reduce bycatch.

Table 8.10. Addressing Significant Bycatch Concerns in HMS Fisheries

Gear	Significant Bycatch Species	
Pelagic Longline	• bluefin tuna • undersized target species • mammals • sea turtles	• Closed areas in Mid-Atlantic Bight in June; South Atlantic Bight area year-round, Charleston Bump Feb-April; DeSoto Canyon year-round; NED area year-round • Gear modifications (gangions length, line clippers and dipnets, handling and release guidelines for turtles) • Northeast Distant Area experiment • Educational workshops • Move after one entanglement • Proposed rule to modify target catch requirements for bluefin tuna retention in 2002
Bottom Longline	• undersized target species • prohibited shark species • target species after a closure	• Observer coverage to collect necessary data • Conducted LCS/SCS stock assessments • Proposed amendment to HMS FMP to address shark management issues **Note**: Minimum sizes are not in effect in the commercial fishery (December 27, 2002: 67 FR 78990).
Shark Gillnet	• undersized target species • protected species • prohibited shark species	• Observer coverage to collect necessary data • Consider VMS requirement during right whale season • Closed area to drift gillnets (strikenets only) • Temporary closure (30 days) due to leatherback interactions • Conducted LCS/SCS stock assessments • Proposed amendment to HMS FMP to address shark management issues

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